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ORIGINAL ARTICLES.

The Interstate Quarantine Law and Its Relation to the Railroads of the United States.

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Address before the Association of Surgeons of the Southern Railway. Chatanooga, Tenn., June 30, 1897.

Mr. President and Gentlemen: It gives me great pleasure to meet with this Association of surgeons of the great Southern Railway Company, and to discuss with you matters of mutual interest which I believe are not generally or thoroughly understood. Happily the relations which the Marine Hospital Service and the railways bear to one another are those of allies. We are allies of one another against a common enemy—contagious disease. This enemy is a destroyer of life, and on that account the Marine Hospital Service has been placed in the field against it. It is at the same time a destroyer of commerce, and on that account the railway systems of the United States are interested in its subjugation. Few people realize or know that there are both laws and regulations for preventing the spread of disease from one State into another. Quarantine is ordinarily considered a maritime affair, and fortunately its operations for the most part do relate to vessels from foreign lands. The national government has made provision to prevent the introduction of disease from foreign countries, and the operations of the Marine Hospital Service under national law begin in foreign ports. Restrictive measures are accordingly enforced on vessels bound to the United States, their cargoes and their passengers, before their departure. On arrival they are subjected to a system of quarantine inspection, and, if necessary, detention and disinfection, which is uniform throughout our whole coast.

It is a striking fact that this country breeds no epidemic diseases which may threaten other lands. If all nations possessed the degree of civilization that prevails in the United States, as manifested by the great regard for sanitary conditions, the prompt suppression of contagious disease and by the earnest regard for the sacredness of human life, maritime quarantine would be a useless institution; but we are constantly threatened by the filth-born diseases of cholera, smallpox, and the plague from the Orient; from the filth-born disease of yellow fever from South America, Central America, the West Indies, and particularly Cuba and Havana; and by the filth-born and filth-disseminated diseases of cholera and typhus fever from India and the continent of Europe. It requires the utmost dilligence and large outlay of money to repel these would-be invaders. Ordinarily we are successful, but we cannot bind ourselves to the fact that martime quarantine may not always give one hundred per cent. of protection, and that epidemic disease may possibly gain admission. To meet the situation which would then confront us, Congress has passed laws looking to the prevention of its further spread.

The constitution of the United States grants to the Congress the right to regulate commerce, both with foreign countries and between the States, and Congress therefore has the right to strip commerce of its disease-bearing properties.

Should one of the greatest epidemic diseases—such as cholera, yellow fever, smallpox or plague—obtain a foothold in the

United States, there are two laws which throw upon the national quarantine authorities the ultimate responsibility in preventing their spread to adjoining States. Section 3 of the act of Congress approved February 15, 1893, requires that if in the opinion of the Secretary of the Treasury the rules and regulations of the several States and municipalities are not sufficient to prevent the spread of contagious or infectious diseases from one State into another, additional rules and regulations shall be made by him, which shall be enforced by the State or municipal health authorities, if they will undertake to execute and enforce them; but if they fail or refuse, the President shall execute and enforce the same, and adopt such measures as in his judgment shall be necessary to prevent the spread of such diseases, and may detail or appoint officers for that purpose.

Practically the same provisions exist in the Act of March 27, 1890; but it is further provided in sections 2 and 3 of that act that any officer or agent of the United States at a quarantine station, or other person employed to aid in preventing the spread of disease, who shall willfully violate the laws of the United States or the regulations of the Secretary of the Treasury shall be deemed guilty of a misdemenor, and be subject to a fine of $300 or imprisonment for not more than one year, or both, in the discretion of the court; and that any common carrier or officer, agent or employee of any common carrier, who shall willfully violate such rules and regulations shall be subject to a fine of not more than $500 or imprisonment for not more than two years, or both, in the discretion of the court.

We are now discussing interstate quarantine, and, as the railroads are the chief carriers of commerce between the States, the pertinency of the discussion is obvious. Under the law of February 15, 1893, section 4, it is the duty of the Surgeon General of the Marine Hospital Service, under the direction of the Secretary of the Treasury, to perform all the duties in respect of quarantine and quarantine regulations which are provided for by the act. In accordance with this act, interstate quarantine regulation, therefore, have been prepared in the bureau of the Marine Hospital Service, and have been duly promulgated by the Secretary of the Treasury. Copies of the regulations are in your hands.

Another important law, and one which provides the financial means for enforcing these regulations, is included in the sundry civil bill annually passed by Congress making appropriations for the ensuing fiscal year.

Under the heading "Prevention of Epidemics," the law reads as follows:

"*Prevention of Epidemics:* The President of the United States is hereby authorized, in case of threatened or actual epidemic of cholera, yellow fever, smallpox, bubonic plague, or Chinese plague or black death, to use the unexpended balance of the sums previously appropriated and reappropriated, . . . or so much thereof as may be necessary, in aid of State and local boards, or otherwise in his discretion, in preventing and suppressing the spread of the same; and, in such emergency, in the execution of any quarantine laws which may be then in force."

The epidemic fund thus provided for amounts now to about $475,000. The President, in his discretion, has directed that this shall be expended, under the direction of the Secretary of the Treasury, through the Marine Hospital Service, the latter being a bureau of the Treasury Department.

Before discussing in detail the interstate quarantine regulations, it will be convenient first to explain in a more general way the theory and the attitude of the government, in accordance with which they have been promulgated—theory and practice which have been adopted and exercised in the past, and which, if necessary, must be utilized again.

There is no overweening desire on the part of the Marine Hospital Service to go into any State and exercise its functions independently of local or State authority. The assistance of the State or local authority, in the first place, is too valuable to be ignored. This attitude was demonstrated in 1893, when two cases of cholera

were found in Jersey City. Promptly upon information to this effect an officer was placed upon the ground, with instructions to visit the local health authorities and explain to them what the general government, in its care for other States and municipalities, would demand, and to carefully observe that these demands were being complied with. At the same time every assistance possible, in the shape of funds and of skilled professional aid, was offered them. These were accepted, and all precautions and all the regulations of the treasury department were promptly enforced by the local authorities; but if they had failed or refused, without loss of time the national authorities would have assumed exclusive control.

The same principles, with some extension, were carried out in Brunswick, Ga., in 1893, where the measures taken to prevent the spread of the yellow fever in the city of Brunswick itself were in accord with the resolutions of the city authorities; but when it became evident that the suppression of the disease in Brunswick was impossible, then the national authority was utilized in preventing egress from the city, excepting through a camp of detention. In 1895 smallpox threatened the State of Texas and other States, through the return to El Paso of a band of 411 immigrants from Mexico, having among them 178 cases of smallpox. The local authorities gladly accepted the aid of the United States government, and shortly thereafter acquiesced in the government assuming all the responsibility and authority.

The great interior States have as much right to protection from disease that has been implanted on our coast or border as the coast and border States have to protection from abroad; and it is in recognition of this right that these laws and regulations have been promulgated.

It is the practice of the Marine Hospital Service, wherever epidemic disease may appear, to have an experienced officer immediately upon the ground. Should the disease be yellow fever, every precaution will be taken to prevent its spread in a given locality; but if a locality becomes infected, then every effort is made to prevent its spread into an adjoining State.

We come now to the consideration of a practice which has given rise to some discussion, but which has been evolved out of necessity and experience. I refer to the establishment of the cordon and detention camp, and I will add that I know of no other means of preventing the spread of yellow fever. After it has been declared epidemic, no person is allowed to leave the locality, except in a prescribed manner. This means that persons wishing to leave the infected district must repair to a detention camp, to be held in observation a sufficient length of time to demonstrate that they are not carriers of the infection. If any other method of dealing with the subject can be suggested, I will be glad to receive the suggestion.

In discussing this matter with the late Dr. Jerome Cochran, a great sanitarian, and expert in yellow fever, he demurred to this procedure. I asked him, as a searcher after knowledge, to suggest an alternative. He replied he would have each State appoint guards on its own borders for its protection. To this plan I objected as being but another and far less efficient cordon—one, in fact, which would be wholly inefficient—and no man bearing the responsibility of the situation would dare to employ this loose method of preventing the disease spreading into adjoining States. There would of necessity be too many open avenues, too many unguarded points; the plan would undoubtedly prove a lamentable failure, and would result in the establishment of shotgun quarantines, now relegated to past history.

There is nothing attractive in the cordon and detention camp; yet, hard as this measure seems, it is the lesser of two evils, and its disagreeable features do not compare with the suffering, the hardships, and disaster which would ensue without it. Much depends upon the location, equipment, and administration of the camp. Two of these camps have been operated by the Marine Hospital Service—the one in 1888, at Camp Perry, Fla.; the other in 1893, at Waynes-

ville, Ga. Since this last date, in view of the unpleasant rumors which have in several seasons reached the bureau, it has been deemed necessary to have ready a movable camp, now stored at Waynesville, Ga., ready for shipment, so arranged that within twenty-four hours after the material has been deposited at the selected site the camp may be in operation. The equipment and the plans are complete for a camp from five hundred to one thousand people.

Now the relations of the railroads to these matters are of great importance.

RAILWAY REGULATIONS RELATING TO YELLOW FEVER.

In yellow fever outbreaks there is always a time when at the beginning it is merely suspected, or the number of cases may be so few and localized that it cannot be called epidemic. At such a time the facts as they exist should be made public, with a view of allowing those who wish to do so an opportunity to leave the neighborhood. Depopulation at this time is to be desired, but under restrictions which are enumerated in the regulations. One of these restrictions relates to the place of destination; and the railroads, therefore, can assist the sanitary authorities in refusing to sell tickets to points other than those designated by the authorities, these designated points being in localities whose altitude or degree of longitude may be such that the disease will not be spread therein.

Furtheremore, certain restrictions relate to the disinfection of baggage of people leaving at this juncture.

Article III. (paragraphs 1 and 5) is as follows:

"1. Persons suffering from a quarantinable disease shall be isolated until no longer capable of transmitting the disease to others. Persons exposed to the infection of a quarantinable disease shall be isolated, under observation, for such a period of time as may be necessary to demonstrate their freedom from the disease. All articles pertaining to such persons liable to convey infection shall be disinfected as hereinafter provided.

"5. No common carrier shall accept for transportation any person suffering with a quarantinable disease, nor any infected article of clothing, bedding or personal property.

"The body of any person who has died of a quarantinable disease shall not be transported save in hermitically sealed coffins, and by the order of the State or local health officer."

Article IV. (paragraphs 1, 2, 6 and 7) has special bearing upon railroad transportation. I will read the paragraphs:

"1. Localities infected with yellow fever, and localities contignous thereto, should be depopulated as rapidly and as completely as possible, so far as the same can be safely done; persons from noninfected localities, and who have not been exposed to infection, being allowed to leave without detention. Those who have been exposed, or come from infected localities, shall be required to undergo a period of detention and observation of ten days from the date of last exposure in a camp of probation or other designated place.

"Clothing and other articles capable of conveying infection shall not be transported to noninfected localities without disinfection.

"2. Persons who have been exposed may be permitted to proceed without detention to localities incapable of becoming infected, and whose authorities are willing to receive them, and after arrangements have been perfected to the satisfaction of the proper health officer for their detention in said localities for a period of ten days.

"6. As soon as the disease becomes epidemic the railroad trains carrying persons allowed to depart from a city or place infected with yellow fever shall be under medical supervision.

"7. Common carriers from the infected districts, or believed to be carrying persons and effects capable of conveying infection, shall be subject to a sanitary inspection, and such persons and effects shall not be allowed to proceed, except as provided for by paragraph 2."

After a cordon has been drawn around an infected locality, egress therefrom may be

had only on one line of railroad, and that under the surveillance of the sanitary authorities.

I wish here to acknowledge the cheerful acquiescence heretofore given by the several railroads to the regulations imposed, and, more than that, their hearty co-operation and valuable assistance.

This was demonstrated in 1893, when, in hastily erecting the camp at Waynesville, Ga., the superintendent of the railroad (Col. Haines), with the great facilities at his command, rendered invaluable aid in the establishment of the detention camp.

The effect of these measures, however rigorous they may seem, is to give confidence in the surrounding country, and to obviate the resort to shotgun quarantines by neighboring cities and towns. To prevent these latter, and to permit through railroad traffic without obstruction on roads running near to the infected district, or through communities peopled by refugees, or on a road running through a slightly infected locality, a system of train inspection service is established to prevent persons suspected of being infected, or from suspected localities, from boarding the through trains. A train inspection service of this kind was established in 1893, extending from Savannah to the southern border of Georgia. It was under the charge of an experienced surgeon of the Marine Hospital Service, assisted by an assistant surgeon and a corps of fifteen sanitary inspectors.

Following are the rules which were enforced by Surgeon Carter to permit the railroads to continue traffic without interruption from local sanitary authorities:

"1. Inspectors will allow none to board a train, unless with a certificate, between Waycross and Savannah.

"2. If certificate can be examined before boarding, without detention of train, it must be done; and if unsatisfactory, the person presenting the same will not be allowed to board.

"3. After boarding, the certificate and the person must be carefully examined, and the inspector assures himself that the passenger is not recently from Jesup or any infected locality.

"4. If the passenger is known to be a recent resident of Jesup or any infected locality, or to have been in such a place two weeks, he will not be allowed to board, even if he has a certificate.

"5. If, after boarding, either the certificate or the examination of passengers is not satisfactory, the passenger will be turned over to the city authorities at Waycross or Savannah, or at the place where he desires to stop, if between these places, and the facts noted and reported.

"6. A record will be kept of the names of all passengers inspected, name of signer of certificate and his rank, date of inspection, date of certificate, and place of boarding train, and where passenger is bound and what disposition is made of him, whether passed or turned over to local authorities; also any other facts worth notice.

"7. Inspectors will aid local quarantine authorities in any way in their power consistent with their duties, and give them any information, and obey all local quarantine regulations."

So perfect was this service, and such the confidence inspired, that through traffic was not impeded, even though the trains passed through the town of Jesup, in which there were some cases of yellow fever.

The railroad officials have acknowledged the great benefit to the railway service through these measures.

In order that this essay may be complete, I append here, without reading, the rules adopted by the Montgomery Conference for railroad quarantine, said conference being held in Montgomery, Ala., March 5-7, 1889:

"1. Quarantine should not be made against any place until it is officially known that yellow fever or other infectious or contagious disease exists at such place.

"2. Only competent physicians should be put in charge of quarantine stations, and only thoroughly qualified persons should be employed as inspectors on railway trains.

"3. Quarantine stations located on railroads should be established at convenient points, on one or both sides of a town or station, as may be deemed necessary.

"4. If an epidemic of yellow fever or other infectious or contagious disease exist at a town or station, trains carrying passengers or freight should be required to pass through the limits of such towns or stations, at a speed of not less than 10 miles per hour, but should stop at the quarantine station.

"5. Passengers to or from such infected point should only be received or delivered at the quarantine station, under the supervision of the quarantine officer in charge of the station.

"6. Railway tickets may be sold to persons leaving any infected place to any point willing to receive them.

"7. All baggage from any infected point should be properly disinfected.

"8. As far as practicable, the same rules proposed for railroads should be applied to vessels of every kind, stage coaches, or other means of travel.

"9. The passage of railroad trains through any point on the line of road, whether infected or not, should not be prohibited by any quarantine regulations. The conductors of passenger trains should close the windows and ventilators, and lock the doors of cars passing through any place where a train is not permitted to stop.

"10. All freight to any infected place should be delivered either at the quarantine station or the nearest railway station to such infected point where it can be properly cared for.

"11. All mail matter from any infected place should be properly disinfected by the United States government, and mail matter intended for infected points should be put off the trains at the quarantine stations. The United States government should instruct postmasters to receive and deliver mails at such quarantine stations.

"12. Railroads and express companies may receive for transportation from any infected place, during the time such infection exists, any merchandise or traffic consigned to places willing to receive it.

"13. State authorities should employ competent persons on passenger trains as inspectors of passengers, baggage, and express matter, as additional precaution; but the fact of inspectors being on such trains should not relieve trains carrying passengers or express matter or baggage from stopping at quarantine stations for such inspection as the officer in charge may determine to be necessary.

"14. It is recommended that all quarantines, as far as practicable, should be uniform in their requirements and operations, which will greatly contribute to the prevention of panics, and tend to allay unnecessary excitement and fear on the part of the people.

"15. The form of health certificate adopted by the Quarantine Convention, held at Montgomery, March 5, 1889, should be prepared for health officers to issue to such persons as may be found entitled to receive the same. A copy of this certificate should be printed with these rules and conspicuously posted at railway stations.

"16. It is the desire and intention of health authorities, as far as practicable, to throw every safeguard around the public health of all localities. Municipial, county and State authorities are expected to cooperate in every possible way with health officers located in towns, villages and cities, and in charge of quarantine stations, to enable them to prevent the introduction or spread of yellow fever or other infectious or contagious diseases."

RAILWAY REGULATIONS RELATING TO SMALLPOX.

There have been other regulations with regard to train inspection service—namely, those issued by the surgeon general of the Marine Hospital Service, October 10, 1885, to prevent the introduction of smallpox into the United States from Canada. They are as follows:

"The act approved April 29, 1878, entitled, 'An Act to Prevent the Introduction of Contagious or Infectious Diseases into the United States,' provides that no vessel or vehicle coming from any foreign port or country where any contagious or infectious disease exists, or any vessel or vehicle conveying persons, merchandise, or animals affected with any contagious disease, shall enter any port of the United States, or pass

the boundary line between the United States and any foreign country, except in such manner as may be prescribed under said act.

"Attention is now directed to the prevalence of the contagious and infectious disease of smallpox in Montreal and other places in the Dominion of Canada, and the law referred to is held to apply alike to trains of cars and other vehicles crossing the border, and to vessels entering ports on the northern frontier.

"Because, therefore, of the danger which attaches to the transportation of persons, and baggage, and articles of merchandise or animals from the infected districts, the following regulations are framed under the direction of the Secretary of the Treasury, and subject to the approval of the President, for the protection of the health of the people of the United States against the danger referred to:

"1. Until further orders, all vessels arriving from ports in Canada, and trains of cars and other vehicles crossing the border line must be examined by a medical inspector of the Marine Hospital Service before they will be allowed to enter the United States, unless provision shall have been made by State or municipial quarantine laws and regulations for such examination.

"2. All persons arriving from Canada, by rail or otherwise, must be examined by such medical inspector before they will be allowed to enter the Uuited States, unless provision has been made for such examination.

"3. All persons coming from infected districts, not giving satisfactory evidence of protection against smallpox, will be prohibited from proceeding into the United States until after such period as the medical inspector, the local quarantine, or other sanitary officer duly authorized, may direct.

"4. The inspectors will vaccinate all unprotected persons who are desirous or are willing to submit to vaccination free of charge. Any such person refusing to be vaccinated shall be prevented from entering the United States.

"5. All baggage, clothing, and other effects, and articles of merchandise, coming from infected districts, and liable to carry infection, or suspected of being infected, will be subjected to thorough disinfection.

"6. All persons showing evidence of having had smallpox or varioloid, or who exhibit a well defined mark of recent vaccination, may be considered protected; but the wearing apparel and baggage of such protected persons who may come from infected districts, or have been exposed to infection, will be subjected to thorough disinfection as provided.

"7. Custom officers and United States medical inspections will consult and act in conjunction with authorized State and local health authorities so far as may be practicable; and unnecessary detention of trains or other vehicles, persons, animals, baggage, or merchandise will be avoided so far as may be consistent with the prevention of the introduction of diseases dangerous to the public health into the United States.

"8. Inspectors will make full weekly reports of services performed under this regulation.

"9. As provided in section 5 of said act, all quarantine officers or agents acting under any State or municipal system, upon the application of the respective State or municipal authorities, are empowered to enforce the provisions of these regulations, and are hereby authorized to prevent the entrance into the United States of any vessel or vehicle, person, merchandise, or animals prohibited under the act aforesaid.

"10. In the enforcement of these regulations there shall be no interference with any quarantine laws or regulations, existing under or to be provided for by any State or municipal authority."

The following are the special instructions for the guidance of sanitary inspectors, issued by Surgeon H. W. Austin, in charge of the inspection service on the Canadian frontier from Buffalo, N. Y., to the Atlantic coast during the epidemic above referred to (See Marine Hospital Report, 1886):

"*Regulations for Sanitary Inspectors.*

"The following instructions will be observed by the sanitary inspector on the following mentioned railroads crossing the United States boundary line, viz.: The

Grand Trunk Railway, at Rouse's Point, N. Y., and Island Pond, Vt.; the Passumpsic Railroad, at Newport, Vt.; the Central Vermont Railroad, at Highgate Springs or Saint Albans; the Canada Atlantic, at Rouse's Point, N. Y.; and the Southeastern Railway, at Richford, Vt.:

"All persons bound for the United States coming from Montreal, or other places in Canada where smallpox prevails, must produce satisfactory evidence to the inspector that they are protected by a recent vaccination, or submit to this operation before they are allowed to cross the boundary line.

"Inspectors will vaccinate all unprotected persons free of charge.

"Persons coming from Montreal or suburban villages will be carefully questioned as to their residence, whether smallpox has occurred in their families, or whether they have been in contact with the disease.

"Inquiries should also be made relative to their baggage, whether it consists of bedding, household goods, etc., likely to be infected; and if any person or article of baggage is considered by the inspector infected or likely to introduce the disease into the country, he or it should not be permitted to cross the line into the United States.

"You may consider persons protected who may show evidence of having had the smallpox or varioloid, or who exhibit a well defined mark of vaccination. Accept as evidence of protection a certificate from any physician in good standing that the person presenting the same has been successfully vaccinated. Should you doubt the validity or authenticity of the certificate, you may refuse any such person presenting the same the privilege of crossing the border unless he submits to vaccination. Baggage known to have come from any infected district, and believed to be infected, will be thoroughly fumigated with sulphur at Rouse's Point, Saint Albans, Richford, Newport and Island Pond.

"Weekly reports should be made to Surgeon H. W. Austin, United States Marine Hospital Service, Burlington, Vt., of the number of trains inspected, number of persons examined, number of persons vaccinated, number of pieces of baggage fumigated, and any other information relative to services performed by the inspector."

RAILWAY REGULATIONS RELATING TO CHOLERA.

In 1893, when there was imminent danger that cholera might be introduced into the seaboard cities of the United States, and carried by immigrants to the interior cities and towns, a carefully formulated plan of railroad medical inspection of immigrants was drawn up; and while it was, fortunately, never necessary to carry out the provisions made at the time, the following regulations, issued in circular form by the surgeon general, Marine Hospital Service, will show the scope and general design of the protective and restrictive measures contemplated:

"*Railroad Medical Inspection of Immigrants.*

"Instructions for the Guidance of Medical Officers of the Marine Hospital Service, Sanitary Inspectors and others Concerned.

"1. One or more medical inspectors shall accompany immigrants from the point of departure of each immigrant train, and shall immediately commence making a careful inspection of every passenger—man, woman and child—upon the train. This inspection shall consist in identifying each passenger with the health card or cards he or she may hold, and satisfying himself as to the health of each person at the time of said inspection. He shall pass through the train once every hour, or oftener if he has reason to believe any person is suffering with diarrhea or other symptoms of cholera.

"2. The railroad companies will be expected to furnish earth closets, which should be used, and the regular closets of the cars are to be locked. These earth closets shall be destroyed before the train reaches its destination, at such points as the railroad officials shall designate. It shall be the duty of the inspector to see that the earth closets are kept clean and frequently disinfected, and the cars properly ventilated and free from all offensive odors and dirt.

"3. He shall, upon the least suspicion of cholera among the immigrants, have the suspected person or persons immediately

removed to the hospital car at the rear of the train, disinfect all ejecta, and take every precaution possible to prevent the spread of the disease among the passengers by thoroughly disinfecting that portion of the car occupied by the suspects, the simplest means for this purpose being a solution of bichloride of mercury in the proportion of 1 to 800.

"4. The inspectors will at once notify the conductor of the train upon the first appearance of a suspicious case, in order that the hospital car may be switched off at the first designated switch, and the health officer in the county in which said switch is located be immediately notified to take charge of this car.

"5. It is expected that the railroads will furnish a car for hospital purposes, in which the seats can be readily converted into beds suitable for the care of the sick. The necessary bedding will be furnished by the United States Marine Hospital Service.

"6. Disinfectants, consisting of packages of bichloride of mercury and an alkali, will be furnished the medical inspector in proper quantities for adding to a two-gallon wooden bucket of water; also a quantity of carbolic acid in solution and other approved disinfectants. Each hospital car shall be equipped with a dozen two-gallon wooden buckets for holding disinfecting fluids, half a dozen mops, one or more hand force pumps with rose sprinklers, one or more commodes and bedpans, half a dozen eight-ounce hard rubber syringes, half a dozen tumblers, one dozen rubber sheets, and one dozen feeding cups for administering medicine. There shall also be furnished an oil stove for heating water, and several tin boilers and tin cups.

"7. Medical supplies, etc., consisting of tannic acid, hydrarg. chloridum mite, tincture of opium, mustard or mustard papers, chloroform or ether sulph., whisky, brandy, and one or more hyperdomatic syringes; also supply of Squibb's Diarrhea Mixture, for checking looseness of the bowels or premonitory diarrhea."

In the foregoing pages I have shown the relations of the railroads to the interstate quarantine law with regard to three of the greater epidemic diseases—yellow fever, smallpox and cholera.

CAR SANITATION.

There is another branch of the subject which is of equal importance; I refer to the transmissibility of other contagious diseases—such as tuberculosis, diphtheria, scarlet fever, measles, and typhoid fever by railways. This subject has been under investigation for more than a year in the laboratory of the Marine Hospital Service.

I will only say at the present time that the results of the investigations thus far made relating to the air, the dust, and scrapings from railway coaches are not such as to excite undue alarm; but the investigation is still in progress, and the co-operation of all the railroad companies approached on the matter, as well as the Pullman Palace Car Company, has been cheerfully given.

A thorough and convenient disinfection of a sleeping coach, without injury to fabrics or other material, is a great desideratum, and it is believed that a scientific and harmless method has been discovered through the operations of the laboratory of the Marine Hospital Service. At the present time it is only necessary to refer to the work of the officer in charge of the laboratory, Dr. Kinyoun, who has already addressed you on the subject of car sanitation.

The result of these labors, it is hoped, will be made known in the coming year.

INTERNATIONAL CONFERENCE AT BRUSSELS.

Now, gentlemen, before closing, I think it will be of interest to this convention and appropriate to the occasion to refer to the "International Conference Concerning the Hygiene and Sanitary Service on Railways and Vessels," which is to meet in Brussels in September next. This will be the second conference of its kind, the first having been held in Amsterdam in 1895.

A few days ago I received through the Department of State, the questions selected by the Committee on Organization to form the subjects of reports at the Brussels meeting.

The subjects are grouped under three

general headings: (*A*) Organization of the Medical service; (*B*) Guarantees of the Efficiency of Employees; (*C*) Hygienic Requirements and Measures. Following are the questions for discussion under each heading:

"(A) *Organization of the Medical Service.*

"What is the best method of organization of the Railway Medical Service?

"The following questions were made the order of the day by the Amsterdam Congress, of 1895, with a view to ascertaining the advantages and disadvantages that may result from their settlement:

"'1. Should the medical service form an integral part of the management, the physicians being considered as agents?

"'2. Should the medical service be attached to the fund for the relief of the employees, and be simply approved by the management?'

"(B) *Guarantees of the Efficiency of Employees.*

"1. Of the influence of predisposition to disease, regard being had to the admission of candidates and to the various duties of railway employees.

"2. Re-examination of employees.

"3. Quantitative determination of the ability to distinguish colors.

"4. Defects of hearing in connection with the railway and navigation service.

"5. Concealment: (*a*) Of defective eyesight; (*b*) of defective hearing.

"(C) *Hygienic Requirements and Measures.*

"1. Methods of preventing the propagation of contagious diseases among passengers and employees on board of railway trains and vessels.

"2. Should employees of railway trains and vessels be allowed to use the intoxicating liquors?

"3. Result of the measures taken to prevent the overworking of employees on railways and vessels during the last ten years.

"4. Organization of the relief service in case of accidents."

At this conference in Brussels, in response to an invitation received through the Belgian minister, the Marine Hospital Service will be represented by the detail of Past Assistant Surgeon Kinyoun, whose report of the proceedings will appear in one of the publications of the Service, and will be mailed on application, to the members of this association.

In conclusion, gentlemen, permit me to express my appreciation of the honor conferred upon me by your president in inviting me to address you, and to thank you for your kind attention.

Various Kinds of Diarrhea.

American Journal of the Medical Sciences.

Dr. R. Hirschberg states that tannigen passes through the stomach without decomposition, but in the intestine is broken up into tannic and acetic acids; this decomposition takes place slowly, so that the entire length of the alimentary canal may be acted upon. The dose for an adult is seven and one-half grains, given in a cachet. If administered in water or milk, it forms glutinous masses which are difficult to swallow. It seems to have its most important use in the diarrheas of various kinds, and is contraindicated in inflammatory conditions of the intestine with marked transudation of serum, in simple dyspepsias, and intestinal disturbances caused by them.

THE Rush monument is still a matter of the future. For a number of years contributions to the Rush monument fund have been solicited, and at the last meeting of the A. M. A. the committee requested that $100,000 be raised. It is gratifying to know that the request met with ready response, Colorado alone giving $2,000. There is no reason why monuments should not be erected to the memory of prominent men in the medical profession as well as statesmen and politicians or generals. We hope the Rush monument fund will receive the necessary support, and that at least the memory of one great medical man may be perpetuated.

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Topeka, Kansas, Saturday, Aug. 7, 1897.

DR. B. D. EASTMAN, who has so long and successfully superintended the State Insane Asylum at Topeka, has been succeeded by Dr. Wetmore from Emporia. There is probably no physician in the West who by long experience and medical ability is more competent to satisfactorily fill the position than Dr. Eastman, but this is entirely a matter of politics.

The First Sound of the Heart.

It is rather a rude awakening when our long established theories and supposed facts are disproven to us, and especially so when they constitute the fundamental physiologic principles upon which our schemes for diagnosis are based.

The greater part of our diagnosis of the valvular heart diseases has been based upon the theory that the closure of the auriculo-ventricular valves produced at least part of the first sound. There have been many opinions as to the various elements entering into its formation, but the part employed by these valves has generally been conceded. But in a recent article Sir Richard Quain makes the assertion that neither the action of the auriculo-ventricular valves nor the muscular contractions of the walls of the heart are causes of the first sound. He says, "the mechanism and action of the mitral and tricuspid valves do not possess the elements necessary to produce such a sound, and that the first sound can be produced independently of the presence or action of these valves." His theory is as follows:

"Having thus endeavored to show that the cause of the first sound is independent alike of auriculo-ventricular action and of muscular contraction of the walls of the heart, I proceed to consider a third event, the most striking and important of all those which occur during the systole of the heart—that is, the propulsion of the blood contained in the ventricles into the pulmonary artery and the aorta, and herein to indicate what seems to me to be the agency by which the sound is produced.

"*The First Sound of the Heart is Caused by the Impact of the Blood Driven by the Action of the Muscular Walls of the Ventricles against the Block Produced by the Columns of Blood in the Pulmonary Artery and Aorta which Press upon the Semilunar Valves.* I would adopt the explanation suggested by my valued friend, the late C. J. B. Williams, that 'sound is a phenomenon resulting from resisted motion.' Let us examine the condition of the circulation with regard to this particular point—namely, resisted motion. In this inquiry I have derived most important assistance from the admirable and elaborate researches of Professor Bell Pettigrew, F.R.S., first on 'The Arrangement of the Muscular Fibres,' in the transactions of the Royal Society of London, 1864, and secondly, on 'The Relations, Structure, and Functions of the Valves of the Vascular System,' published in the

transactions of the Royal Society of Edinburgh, 1864. These refer especially to the left ventricle, but, at the same time, it is to be observed that what applies to this ventricle applies, only in a lesser degree, to the right ventricle. Professor Pettigrew explains the manner in which the column of blood, projected from the heart into the aorta, is formed by the union of three columns—an arrangement which results from the mechanism of the heart as fully described by him. These columns ultimately unite into one before reaching the orifice of the aorta. The columns have a spiral motion, which is the result of the spiral arrangement of the muscili papillares, of the spiral arrangement of the fibres composing the walls of the ventricle, as well as of the current, are shown in the blood-cast from the interior of the left ventricle of a horse, which, by permission of the president of the Royal College of Surgeons of England, I am able to submit to examination.

"By this spiral, or what might be called 'rifle,' motion the blood is seen to be directed against the segments of the semilunar valves, which are thereby hastily thrown apart, the spiral current being continued for some distance within the aorta. The beautiful rifle mechanism here described is constructed with definite objects of giving precision to the direction of the moving body against a given point, and of securing greater velocity and force in that body—the moving column of blood. We have, in fact, here represented in nature—a matter of the deepest interest to the biologist—the mechanism of the comparatively modern rifle. The resistance to the stream of blood issuing from the ventricle is offered by the block formed by the column of blood resting on the aortic valves. These in their action are described by Professor Pettigrew as 'closed by a spiral movement, by which these valves are wedged, and, as it were, screwed more and more tightly into each other;' the movement here—the spiral movement—being caused by 'the direction of the sinuses of Valsalva, which curve toward each other and direct the blood in spiral waves upon the mesial line of each segment.'

"We find that various estimates have been given of the absolute propelling power of the ventricles and of the resistance of the column in the pulmonary artery and in the aorta respectively. For example, Professor Michael Foster says: 'If we take a hundred and eighty grammes as the quantity in man ejected at each stroke at a pressure of 3.21 metres of blood, this means that the left ventricle is capable at its systole of lifting a hundred and eighty grammes 3.21 metres high—*i.e.*, it does five hundred and seventy-eight gramme-metres of work at each beat.' Different estimates of the propelling force are given by the physiologists, and the estimates of the resistance vary more even than the estimates of the propelling power. It will therefore suffice to say that authorities are substantially agreed that the driving power and the resistance are in the proportion of four to three, the really important point for our present purpose being the relation they bear to each other. In the emotion thus described and the resistance we have all the elements for the reproduction of a sound; and a sound being produced, we ask what it is. The reply must be, 'The first sound of the heart, the cause of which we now seek.'"

If it is admitted, the author continues, that sound is a result of resisted motion, there is in this instance a remarkable illustration of movement and resistance. The movement of the blood with all the force, precision, and velocity of a rifle or spiral movement is directed against a fixed and definite resistance, the moving power and the resistance being capable of definite measurement, and found to be quite sufficient themselves to explain the source of the sound of which we are in search.

The author alludes to another point of interest– namely, that the sound disappears last over the semilunar valves, and also that the returning sound is first heard in the same situation. It is also an object of great interest, he says, to compare the characters of the two sounds in relation to the seat of their origin at the semilunar valves. In the first sound there is the character of pro-

pulsive force and sustained action, softer and more prolonged than the second, which is sudden, sharp, and short, as if produced by an abrupt mechanical disturbance. These distinctions, he says, serve to convince us that the sounds are both produced at the same point, at the semilunar valves, each by its own single and simple agency.

Lastly, he adds, sounds resembling the first (and second) sound of the heart can be produced artificially. The author here gives a detailed description of how the experiment was made with a sheep's heart.

THOSE who have had an occasion to use an ambulance in Topeka will be pleased to know that a fine ambulance has been procured by one of our undertakers, and will be furnished free of charge.

This reminds us that it would be a good thing to establish an ambulance corps to be under the direction of the police surgeon during fall festival week. There are always accidents, and immediate relief would be a commendable feature.

IF the principal part of the exercises for the fall festival are to be conducted at the fair grounds, would it not be well to have a hospital there and a medical corps in attendance? There will no doubt be a much larger crowd than last year.

DR. W. L. SCHENCK, from New Castle, Colorado, is visiting in the city.

Five Hundred Cases of Cardiac Disease

Dr. James K. Crook, *New York Medical Journal*, draws some practical conclusions from his observation and treatment of cases of this kind at the New York Post-Graduate Hospital.

In a total of 5,827 patients, 503, or between 8 and 9 per cent., suffered from heart disease, either organic or functional, the latter somewhat predominating, especially among the female subjects. Mitral regurgitation took the lead in valvular lesions, numbering 60 cases; aortic stenosis came next with 36; mitral stenosis, 35; aortic regurgitation, 7; tricuspid regurgitation, 6; double aortic lesions, 19; double mitral lesions, 12; myocardial degeneration, 6; thoracic aneurism; simple cardiac hypertrophy, 10 cases. The functional disorders in the males were due almost entirely to digestive ailments or the excessive use of tobacco or alcoholic liquors. In the female patients anemia and chlorosis played a leading part in the causation of functional cardiac troubles, which were improved as a rule by improving digestion and by the removal of other exciting factors. The writer emphasizes the fact that hemic murmers are almost invariably basic and systolic, are seldom heard below the third rib, are usually transmitted into the great arteries of the neck, and are generally accompanied by a venous hum. Their disappearance with improvement in the general condition may also be of aid in diagnosis. The water-hammer pulse was present in every instance of aortic reflex and the author considers it as valid and probably a more constant sign than the murmur itself. This condition of aortic incompetency was present in all the cases of extreme cardiac hypertrophy and dilatation observed by the writer. Among eighty cases of aortic disease there were 51 males and 29 females, a disproportion which may be accounted for by the greater muscular strain to which men are usually subjected. Of all the valvular troubles aortic regurgitation is the most fatal in its tendencies, and in well marked cases life can hardly be prolonged more than four or five years. Mitral regurgitation, the most frequent, is also the most hopeful and the least distressing of valvular defects. The author brought a patient before the New York State Medical Society who had led an active busy life and yet had this lesion for thirty-three years. Mitral stenosis is placed next to aortic insufficiency as regards prognosis and the de-

gree of discomfort suffered by the patient; recurring attacks of bronchitis often aggravating matters. Uncomplicated aortic stenosis is a very frequent lesion. Though often well borne for a long time it constitutes a dangerous and insiduous menace to life, being a frequent cause of sudden death while in apparently good health. The cases of tricuspid regurgitation under the writer's care were generally the result of pulmonary emphysema.

Worth Remembering.

Messrs. John Carle & Sons, New York City—GENTLEMEN: It affords me pleasure to inform you of my high estimation of the value of Imperial Granum in a recent case of obstinate vomiting of pregnancy. For many days at a time my patient could retain practically nothing in the way of nourishment until the Imperial Granum was tried, when the stomach immediately became more tolerant and nutrition was rapidly regained —and at this writing, four weeks from the time she began its use, she is still relying almost exclusively on it for nourishment.

It is safe for me to say that in the future I shall depend on the Imperial Granum when its use is indicated, and with best wishes for your success, I am,

Yours very truly,

—— ——, M.D.

Physicians can obtain samples of this most valuable prepared food free, charges prepaid, on application to John Carle & Sons, 153 Water Street, New York City.

Ferratin in Tuberculosis.

Dr. W. T. Parker, in a paper on "Normal Horse Blood Serum in the Treatment of Tuberculosis," read before the section of State Medicine at the June, 1897, meeting of the American Medical Association, speaking of the treatment of tuberculosis, says:

"In those cases where tuberculosis has been successfully treated by therapeutic methods, iron has been the most valuable remedy. As everyone knows the preparations of iron are very numerous, some of them positively harmful, others inert and useless, while a few are capable of being readily assimilated. Of this kind, Ferratin is one of the new remedies recommended by the committee of revision for adoption into the new fifth edition of the Russian Pharmacopeia (*Chemiker Zeitung*, 31, 1897).

"This is an organic iron compound of albumen and tartrate of iron, forming a definite iron albuminic acid; it contains 7 per cent. of iron, is readily absorbable, does not constipate, and has no untoward effects. On the testimony of its discover and others, it is identical with the natural ferruginous element of food, absorbed in the system and stored in the liver and other organs as a reserve iron for blood formation (*Journal of the American Medical Association*). Lately this preparation has attracted considerable attention, not only in this country but in Europe, so much so that its future success would seem assured."

It Quiets Pain and Promotes It.

Rather a paradoxical statement. True, nevertheless. When pain is useless, then antikamnia quiets it; when it is necessary, the same remedy increases it. This refers to the use of antikamnia in the pain of labor and as a promoter of labor pains.

H. C. Reemsnyder, AM., M.D., of Philadelphia, in a recent article says that whenever there is unnecessary pain in labor he administered ten grains of antikamnia, repeated in two hours if necessary. In this way the pain which annoys the woman without helping her is relieved, while the uterine contractions become more firm, and labor is accelerated.

Dr. R. B. McCall, Hamersville, Ohio, contributes an article to the *Woman's Medical Journal* on this same subject. He says: "In cases marked by unusual suffering in second stage, pains of nagging sort, frequent or separated by prolonged intervals, accompanied by nervous rigors and mental forebodings, one or two doses, five grains each, of Antikamnia Tablets promptly changes all this. Indeed in any case of labor small doses are helpful, confirming efforts of nature and shortening duration of process."

DOCTOR:—Your library is not complete without the *Hypnotic Magazine*. Cost of this handsome monthly, including premium book on "Suggestive Therapeutics" is only one dollar ($1.00) a year. THE PSYCHIC PUBLISHING CO., 56 Fifth avenue, Chicago.